Statement of Work
for
Replace Family Housing
Design Build Plus 03
Denver, Colorado

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for
STATEMENT OF WORK

CHAPTER 1
PROJECT SUMMARY
1.0 GENERAL

1.1 SCOPE
This project includes design and construction of complete and usable permanent structures consisting of all labor, consultant services, materials and equipment and all necessary site improvements, and structures and off-site work (utilities, roads, etc.) as may be required for the construction of 84 new family housing units (Basic Proposal, FY 03) on government owned land in Denver Colorado, complying with the requirements of this Request for Proposal (RFP), using the “design/build plus" process through execution under indefinite delivery indefinite quantity (IDIQ) contract action. Special attention should be given by Contractors in that these facilities will be considered "turn-key" design and construction with all operational equipment to be provided by the Contractor (see paragraph 14, Equipment).

This Sample Task is based on a completed project elsewhere. The design requirements are consistent with those used at the completed project. Task orders awarded under the DBP03 contract will require the use of current design guidance at the time of award of the task order.

1.2 SUBMITTALS
Respondents to this SOW must provide sufficient data and detail with their submittals to demonstrate compliance with, or exceed, these minimum requirements utilizing the expertise of their own forces in designing and constructing similar facilities.

1.3 UTILITIES
Adequate utility capacities for power, gas, water, and sanitary sewer are available on-site to support the new family housing area and supporting facilities functions. Connection to existing utilities to the construction site is demonstrated to the five foot line from each floor plan type.

1.4 Not Used.

1.5 Not Used

1.6 Not Used.

1.7 RECYCLED AND RECOVERED MATERIALS IN CONSTRUCTION
The contractor shall comply with all provisions of Section 6002 of Resource Conservation and Recovery Act and Executive Order 12873, Federal Acquisition, Recycling, and Waste Prevention, that requires the use of recycled and recovered materials and products. The use of other materials must be approved with the submittal by the Contracting Officer. Other materials and products not listed, but commonly used in industry outside the government, shall also be considered by the Contractor. All material and product submittals shall list recycled or recovered materials and percentage content.

1.8 RECYCLING DURING CONSTRUCTION
The Contractor shall recycle all recyclable waste generated during construction. The Contractor shall not place non-recyclable waste refuse into recycling bins.

1.9 UNITS OF MEASURE
The work shall be designed and constructed in “soft metric” units. “Soft metric” refers to designing in English or inch-pound (IP) units, and providing the equivalent metric dimensions in parentheses beside the IP dimensions.

2.0 PRODUCTS

2.1 REFERENCES
Outline specifications contained in this SOW are intended to illustrate minimum acceptable standards. Respondents must propose products they intend to use for each phase of the work. Any appropriate building

systems, operational equipment, materials, and methods to meet minimum standards may be proposed by the Design/Build Team.

2.2 QUALITY
Construction materials shall be new.

3.0 EXECUTION

3.1 STANDARDS
Comply with the requirements of product manufacturer's applicable standards contained in this chapter, the approved design documents, referenced standards, and in coordination with the trades involved.

3.2 DESIGN
After contract award and upon receipt of Notice to Proceed, prepare detailed construction design documents that are suitable to adequately demonstrate the materials and methods of construction as proposed. The specifications shall be prepared using Construction Specifications Institute (CSI) format (Divisions 1 through 16), as amended by the government. Submit the documents to the government for review at approximately the 50 percent, 90 percent, 100 percent back-check, and 100 percent completion levels. (See Chapter 2, Design, paragraph 2). Failure on the part of the contractor to gain approval of his design due to inadequacies in design shall not be grounds for any extension to contract performance.

3.3 CONSTRUCTION
Construction activities may begin on utilities and foundations after government approval of the initial design submittal accompanied by partial notice to proceed (NTP) from the contracting officer. The approved initial submittal must be in accordance with Chapter 2 requirements. Formal NTP for the remaining work is subject to prototype acceptance (by system) and approval of the final design submittal.

4.0 MISSION UNIQUE AND MANDATORY BASE REQUIREMENTS

There are certain functional areas within a military family housing area which are not considered for a private sector housing area but are desirable or required (unique or mandatory) for the proper operation of a military family housing area. These areas are described below and should be considered in the proposal.

4.1 UNIQUE
Several areas are considered unique to military family housing and need to be incorporated into the design. These areas are compliance with net and gross square footage restrictions.

4.2 MANDATORY BASE REQUIREMENTS
Conform to the Air Force standards to include:

- Construction Sign Standards
- Americans with Disabilities Act Designer’s Checklist

5.0 HOUSING DESIGN AND CONSTRUCTION CRITERIA

5.1 OBJECTIVES
Develop proposals, design, and construct the housing community in accordance with the objectives and operational standards listed in this RFP, and sound and efficient engineering practices. The Air Force Family Housing Guide for Planning, Programming, Design, and Construction (AFFHG), dated December 1995, provides Air Force design guidance and requirements for this project. This document can be accessed in its entirety on the Internet at http://www.afcee.brooks.af.mil/dc/dch/mfhguide/guide.asp. Requirements listed in this SOW take precedence over those listed in the AFFHG.
(Note: FOR PURPOSES OF THIS SAMPLE TASK, square footages to be applied will be based using the OLD net square footage standards, which will result in slightly smaller units than will be anticipated under the revised AFFHG criteria.)

5.1.1 HOUSING TYPES

The objective is to allow the Contractor latitude in providing housing types, designs, and materials to serve the government's needs as owner-operator of suitable permanent quarters for military families. Existing house plans or modifications thereof that meet the design and construction criteria specified herein, which a Contractor has previously constructed and priced, may be submitted. Required floor plan and elevation schemes to be submitted with the proposal are listed in Table 5.1.1.

BASIC PROPOSAL		
Unit Type	Floor Plan Schemes Required	Elevation Schemes Required
3BR JNCO	1	1
4 BR JNCO	1	1
3BR Handicapped adaptable	1	1

Table 5.1.1 – Mandatory Housing Schemes

5.1.2 INTEGRATED DESIGN

The objective is to obtain housing structures that provide the most compatible resolution of integrating structure to site, and the optimal balance of architectural attractiveness and variety, function, design, and low cost maintenance and operation. Refer to the excerpts from the AFFHG for detailed criteria and guidance.

5.2 GENERAL REQUIREMENTS

5.2.1 HOUSING UNITS

Both stand-alone and duplex units are acceptable. A combination of single level handicapped, and one- and two-story regular units is preferred. Duplex units may not be stacked where any part of one unit is directly above any part of a second unit. Garages shall be provided for this project. Use the maximum square footage allowable and practical for each unit. The project shall provide for distribution of units and the respective programming benchmark net floor areas.

5.2.1.1 GROSS FLOOR AREA

The floor area consists of all interior spaces (finished and unfinished) within the exterior faces of exterior walls and centerline of party walls (in multiplex units) of housing units with the following areas of exclusion: carports/garages, exterior bulk storage (detached), trash enclosures, porches (open or closed) which are not heated or cooled and which retain the basic characteristic of a porch, terraces, patios, decks, balconies, and entrance stoops.

Proposal For 84 Junior NCO Units		
Type	Number of Units	Maximum Net Floor Areas Authorized Square Feet/SM
3BR JNCO*	76	1200/111
4BR JNCO	8	1350/125

Table 5.2.1.1 – Authorized Housing Unit Net Floor Area

* The basic scope calls for handicapped adaptable units. This scope of work incorporates handicapped adaptable units as follows: four 3BR JNCO units. Floor area for handicapped adaptable units carry a five (5) percent allowance above the programming benchmark gross floor area without any additional approval mandate.

5.2.1.2 FAMILY SIZE

Assume the following family size for units: 3BR - 4 persons and 4BR - 6 persons.

5.2.2 PROTOTYPE UNITS

After contract award, prototype units shall be required for each typical unit type constructed on site to demonstrate construction details, and quality of construction. Each stage of work shall be completed and approved on the prototype unit prior to starting work on the same stage for similar units in the project. At the site, construction details will be exposed for study by authorized inspectors. The prototype units will be used to verify

the details of the approved design and material selections and to establish the standards of construction and workmanship against which the remaining work will be judged. Work on each successive stage of the prototype units may begin immediately after the approval of the preceding stage. As a minimum, the stages of work in a prototype unit, which shall be subject to approval by the Contracting Officer, shall include the following:

	DESCRIPTION OF WORK
1	Foundations – Excavation, Footings, Forms, Reinforcement, Concrete, etc.
2	Concrete work
3	Rough framing (floors, walls, partitions, roofs)
4	Wall and roof sheathing, sub-flooring
5	Roofing
6	Plumbing, mechanical, electrical rough-in
7	Masonry work (walls, etc.)
8	Insulation (under slab, floors, walls, ceilings or roofs)
9	Exterior finishes (siding, masonry veneer, stucco, doors, windows etc.) and trim
10	Drywall installation
11	Drywall finishing
12	Interior finishes and trim
13	Installation of fixtures and equipment (plumbing, mechanical, and electrical)
14	Finish carpentry and cabinetry
15	Infiltration compliance
16	Doors and Windows

Table 5.2.2 – Stages of Work Approved by Contracting Officer

5.2.3 CALCULATIONS AND DRAWINGS

The successful Contractor shall prepare plans and design calculations as required for design submittal requirements specified in Chapter 2. These diagrams, calculations, and drawings shall be prepared under the supervision of a licensed professional engineer or registered architect in the State of Colorado, as appropriate. Final submittals shall be stamped and signed by the licensed professional engineer or registered architect.

(NOTE: For the purposes of this Sample Task, include the cost to prepare stamped and sealed drawings, DO NOT provide the seals for this response).

5.3 TECHNICAL CRITERIA AND STANDARDS

The technical criteria and referenced standards in this SOW represent the minimum quality and quantity acceptable for each proposal. In case of conflict between the SOW and referenced standards, the most stringent criteria shall govern.

5.4 ENERGY CONSCIOUS DESIGN

Contractors shall comply with the Design Guide for Military Family Housing: Energy-Efficient Revitalization and New Construction, which provides instructions for designing, selecting and documenting cost-effective energy-efficient options for new housing units, and specifying both the cost-effective energy-efficient options identified and the building equipment performance verification testing requirements. Energy conservation measures (ECM) point system worksheets, the output from the Conservation Optimization Standard for Savings in Federal Residences (COSTSAFR) and Computerized, Automated Point System (CAPS) computer programs. The worksheet provided is for a three bedroom, two story housing unit; however, the insulation values will apply to all single story and four bedroom units as well. Contractor completed worksheets shall be submitted with the proposal for each housing type.

6.0 APPLICABLE STANDARDS

6.1 GENERAL

The objective is to obtain contemporary family housing commensurate with the standards in the local communities in and around the City of Denver, Colorado. The housing will be constructed in accordance with sound and efficient construction practices and the latest editions (at the time of solicitation) of the following standards:

TABLE 6.1: APPLICABLE STANDARDS
CODES:
National Electric Code (NEC)
National Electric Safety Code (NESC)
National Fire Protection Association (NFPA)
Uniform Federal Accessibility Standard (UFAS)
Americans with Disabilities Act Architectural Guide (ADAAG)
International Council of Building Officials (ICBO)
Council of American Building Officials (CABO) One and Two Family Dwelling Code, 1995
Uniform Building Code
Uniform Mechanical Code
Uniform Plumbing Code
REGULATIONS
Design Guide for MFH – Energy Efficient Revitalization and New Construction
OSHA. Title 29, Code 4, Federal Regulation Parts 1921, 1926 & 1910.
Military Handbook 1008C
ARI 210-81
INDUSTRY STANDARDS
DoD Directive 6050.9 Ozone Depleting Chemicals
Mechanical Systems: ASHRAE and SMACNA
Illuminating Engineers Society Handbook
Aluminum Association "Specification for Aluminum Structures"
ASTM: D 1557-91, D 3034, D 3212, C 828E-1, C 924-89, E119, E90, E84-Rev A, E 152 Rev A, A615/A615M Rev B, A185 Rev A, E779.E1 (latest versions)
Underwriters Laboratories (UL): Standard 268- (latest versions0
American National Standards Institute (ANSI): B31.8, B16.3, Z21.45, Z124.1 (latest versions)
American Iron and Steel Institute (AISI)
American Welding Society (AWS)
National Kitchen Cabinet Association
Directory of Certified Air Conditioners
American Gas Association (AGA)
American Society of Heating, Refrigeration & Air Conditioning (ASHRAE): 90A-80
American Concrete Institute (ACI) 318- (latest version)
Brick Institute of America (BIA)
American Association of Textile Chemist and Colorist Test Methods
American Water Works Association (AWWA)
American Institute of Steel Construction (AISC)
American Plywood Association (APA)
American Wood Preservers Association (AWPA)
National Association of Architectural Metal Manufacturers (NAAMM) "Metal Finishes Manual"
National Association of Corrosion Engineers (NACE)
National Forest Products Association
National Woodwork Manufacturers Association (NWMA): 3 I.S.1.2-, I.S.1.4- (latest versions)
Steel Joist Institute
Truss Plate Institute
Department of Energy, 10 CFR, Char II, Section 435.103
Note: If a conflict occurs between any of the standards above, the most stringent standard shall govern.

7.0 SITE DATA

7.1 SITE AND SITE PLANNING: Not Used.

7.1.1 PLANNING: Not Used.

7.1.1.1 DISPOSAL: Not Used.

7.1.2 BUILDING ARRANGEMENTS: Not Used.

7.1.3 LAND USE: Not Used.

7.1.4 BUILDING SETBACKS AND SEPARATION: Not Used.

7.1.5 STREETS, DRIVEWAYS, SIDEWALKS, BIKE PATHS AND FENCES

7.1.5.1 GENERAL: Not Used.

7.1.5.2 STREET WIDTH CRITERIA: Not Used.

7.1.5.3 CUL-DE-SACS: Not Used.

7.1.5.4 CURBS AND GUTTERS: Not Used.

7.1.5.5 GARAGE FLOORS: Garage slabs shall be 5-inch minimum thickness reinforced concrete with vapor barrier. Concrete slabs shall be poured over minimum 6-inch compacted granular base course.

7.1.5.6 OFF-STREET PARKING: Not Used.

7.1.5.7 SIDEWALKS: Not Used.

7.1.5.8 BIKE PATHS: Not Used.

7.1.5.9 HANDICAPPED ACCESSIBILITY (This paragraph applies to site only. Unit accessibility is subject to mandates of the AFFHG): Not Used.

7.1.5.10 STREETS SIGNS: Not Used.

7.1.5.11 NEIGHBORHOOD PERIMETER FENCING: Not Used.

7.1.5.12 BACKYARD FENCES*:* Not Used.

7.1.5.13 HOUSING DEVELOPMENT ENTRY: Not Used.

7.1.5.14 BUS STOPS: Not Used.

7.2 GOVERNMENT GEOTECHNICAL REPORT: This report is provided only for information for Contractors to use in developing a proposal. If modifications to the foundation requirements contained in the report are deemed necessary by the Contractor's soil engineer, such modifications shall be explained and supported by appropriate field investigation and analysis. Such modifications shall become effective only if approved in writing by the Contracting Officer. See Attachment 1.

7.2.1 CONTRACTOR SOIL AND FOUNDATION REPORT: Not Used.

7.3 SOIL COMPACTION: Soil compaction shall be achieved by approved equipment well suited to the particular soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the compaction specified with the equipment used. Compact each

layer to not less than the percentage of maximum density specified below, determined in accordance with ASTM D 1557.78 Method B or D:

Sub-grade Preparation, Fills, Embankments, and Backfill	**Compaction Requirements (% of Maximum Density)**
Under structures, building slabs and paved areas and in trenches under pipes beneath concrete slabs on grade	95%
Under sidewalks, patios, and other miscellaneous slabs	90%
Note: These compaction requirements shall be modified as recommended by the Contractors' soils report if the native soils so dictate	

Table 7.3: Soil Compaction Requirements

8.0 SITE UTILITIES

8.1 GENERAL
For purposes of this submission, site utilities are those considered within the five-foot line.

8.2 WATER DISTRIBUTION SYSTEM

8.2.1 GENERAL
Contractor shall provide new water distribution system for this project. Connect to existing system (if available). The Contractor is responsible for capping and/or relocation of all existing water systems where applicable. Lateral pipes from the five-foot line shall be Type L copper.

8.2.2 WATER DISTRIBUTION SYSTEM PLANS
Not Used.

8.3 SANITARY SEWAGE SYSTEM
For purposes of this submission, site utilities are those considered only within the five-foot line.

8.3.1 GENERAL
Contractor shall provide new sewage system for this project. The Contractor is responsible for capping and/or relocation of all existing sewage systems (where applicable). Avoid placing manholes in housing unit yards.

8.3.2 DESIGN CRITERIA
Sanitary sewage system shall be designed and constructed in accordance local codes and regulations. All sewage piping shall be in accordance with local governing codes.

8.3.3 MINIMUM VELOCITY
A minimum velocity shall be 2.5 feet per second when flowing at the maximum design flow depth. Lower velocities in lines less than 6" in diameter is permissible if codes are met and the system is designed to operate properly. Design pipes with 80 percent full as critical flow depth.

8.3.4 SEWAGE REQUIREMENT
Design shall be based on an average daily per capita flow of sanitary sewage of 100 gallons per day with a peak hourly factor of 4. Assume following family size:

Type Unit	**No. Persons**
3-Bedroom	4
4-Bedroom	6

Table 8.3.4: Sewage Load by Unit Type

8.3.5 SEWER LATERALS
Sewer lateral lines (connections from interior house sewer lines to main) shall be 4-inch minimum. Each unit shall have a separate sewer lateral line. Only interior house sewer lines may be placed under buildings. House sewer lines from any one unit shall not pass under any other unit(s). Cleanouts shall be provided according to applicable code(s).

8.3.6 CALCULATIONS AND DRAWINGS
Not used for site analysis.

8.3.7 COORDINATION:
The Contractor shall coordinate all work on existing and new sewer line(s) with all responsible local utilities and city offices.

8.3.8 LEAKAGE TESTS
Not Used.

8.3.9 TEST FOR DEFLECTION
Not Used.

8.4 GAS DISTRIBUTION SYSTEM

8.4.1 GENERAL
The Contractor shall provide a new gas distribution system connected to the existing system. The gas system shall be government owned, operated and maintained. Design and installation of system shall comply with the AFFHG, paragraph 3.1.6., and local codes. The Contractor is responsible for verification of locations/psi rates, capping and/or relocation of all existing gas systems (where applicable).

8.4.2 CATHODIC PROTECTION
Cathodic protection shall be provided for all gas distribution system material subject to corrosion. All ferrous metal underground utility components, including piping, valves, connections, sleeves, etc., shall be protected by a cathodic protection system. The Contractor shall provide a cathodic protection engineer certified by the National Association of Corrosion Engineers to perform soil testing, layout, design and inspection of installation of the system. Soil testing shall be done as required as needed.

8.4.3 INSTALLATION
If gas mains are within the 5-ft line, they shall be placed above the other utilities.

8.4.4 MATERIALS
Materials and appurtenances shall be free of defects and suitable to accomplish the stated objectives for gas distribution systems. The standard for new gas lines, as they relate to this statement of work, is polyethylene pipe and plastic valves.

8.4.5 TESTING
The Contractor shall prove the entire system of gas service lines to be gas tight by air test in accordance with ANSI B31.8. Test shall continue for at least 24 hours between initial and final readings of pressure and temperature.

8.4.6 COORDINATION
Contractor shall coordinate with local gas company.

8.5 ELECTRICAL DISTRIBUTION SYSTEM: NOT USED

8.6 TELEPHONE

8.6.1 GENERAL
Contractor shall pre-wire all housing units and coordinate with the local telecommunications provider for connection of the telephone distribution system to the outside connection box for this development. Each unit shall have four pairs with duplex outlets for telephone in each of the following rooms: the living room, all bedrooms, kitchen, and family room (den). All outlets shall be flush-mounted except kitchen outlet, which shall be wall-mounted. Large contiguous rooms such as living room-dining room combinations shall have an outlet on opposite walls. Outlets shall be individually wired back to a central distribution panel and have duplex electrical receptacle adjacent to them.

8.6.2 COORDINATION
All work on new phone connections provided by Contractor shall be coordinated with the local telecommunications provider and the city representative having authority over the site.

8.7 CABLE TELEVISION
Contractor shall pre-wire all housing units and coordinate with the local cable television provider for installation of the cable distribution system. Each housing unit shall have, as a minimum, one outlet in the family room, one in the living room, one in each bedroom, and one in the kitchen. All television cable shall be routed to a junction box at the rear of the housing unit near the proposed electrical service entrance.

8.8 TRENCHING
Electric, telephone, and cable TV may be placed in the same trench as identified in paragraph 8.5.2.

8.9 MARKING
Within the 5 ft line, all underground utilities shall be marked with plastic marking tape of a type specifically manufactured for marking and locating underground utilities. Tape shall bear a continuous printed inscription describing the specific utility.

Color	Utility
Red	Electric
Yellow	Gas
Orange	Telephone
Blue	Water Systems
Green	Sewer Systems

Table 8.9 – Color Markings for Utilities

9.0 GRADING AND DRAINAGE

9.1 GENERAL
Confine all work, except grading and drainage, within the project boundaries. Under no circumstances may the Contractor contemplate any grading and drainage work off the Air Force property.

9.2 DESIGN CRITERIA
The Contractor shall provide documentation that shows site drainage design has considered the effects on surrounding areas and the existing drainage system and adjacencies from the 5-ft line.

10.0 LANDSCAPE

10.1 GENERAL
Not Used.

10.2 LANDSCAPE DESIGN
Not Used.

10.3 RECREATION / COMMON AREAS
Not Used.

10.4 SPRINKLER SYSTEM
Not Used.

11.0 HOUSING UNIT DESIGN / CONSTRUCTION

11.1 GENERAL
The design shall be in accordance with the AFFHG. Design shall be within the gross and revised floor areas authorized for the respective type units specified and conform to good local practices with functional areas arranged and sized for efficient use, circulation and furniture placement. Arrangement of floor area for food preparation, dining/living, sleeping, bathing, circulation (halls), clothes storage (closets), and services should be functional and in balance for the purposes served.

11.2 ENERGY EFFICIENCY DESIGN
Contractors are encouraged to minimize energy consumption during the heating and cooling seasons through the application of energy efficient designs within the housing units. System operation shall not require special attention by unit occupants.

11.3 ACCESSORY INSTALLATION

11.3.1 TRAVERSE RODS
Traverse type rods shall be installed over window openings 5’-0" or more in width and over exterior patio doors in living and dining areas. Curtain rods shall be provided over all other window openings, and shall provide sufficient stacking room.

11.3.2 BLINDS
Horizontal mini blinds shall be provided for all windows.

11.3.3 TRASH AREA
Provide as a minimum a sight-screened trash area designed for two 40-gallon containers for each housing unit.

11.3.4 SCREENING WALLS
Provide privacy screening from adjacent housing units at all patio areas.

11.3.5 HOUSE NUMBERS
Provide both building numbers and unit numbers; freestanding buildings (single unit or duplex) will require a building number plus each individual living unit within a building will require a unit numbers. Each housing unit shall have a lighted unit number visible from the street.

11.3.6 DOOR BELL
Front entrance of each unit shall be provided with a low voltage bell.

11.3.7 FLAG HOLDERS
Provide a flag holder for each housing unit.

11.3.8 FIREPLACES
Not permitted.

11.4 NOT USED

11.5 CONSTRUCTION MATERIALS:

11.5.1 BUILDING EXTERIORS:

11.5.1.1 FOUNDATIONS
Permanent foundations shall be provided. Footings and stem walls shall be concrete.

11.5.1.2 WOOD TREATMENT
Wood in contact with soil or concrete shall be protected against the effect of excessive moisture, wood destroying insects, and fungi by pressure treatment in accordance with recommended practices and local codes. Decay protection shall be provided for all materials in contact with soil or concrete. A minimum 5-year warranty shall be provided.

11.5.2 ROOFS:

11.5.2.1 SHINGLES
Contractor shall use fire-resistant, mineral granule surfaced, interlocking, asphalt-saturated organic felt composition shingles, or approved equal, complying with local wind resistance and external fire exposure standards. Note: Weather conditions at the project site, sustained high winds, long periods of below-freezing temperature, and driving rains, should heavily influence design decisions on roofing materials and installation methods.

11.5.2.2 Wood shake, or wood shingle tile roofing are not acceptable.

11.5.2.3 MINIMUM SLOPES
Minimum slopes for roofs shall be 4 inches in 12 inches (unless specified by manufacturer to be steeper).

11.5.2.4 FLASHINGS
Flashings shall be metal with factory finish to be compatible with unit color scheme. Installation shall comply with manufacturer’s high wind area installation instructions. Provide grounding for metal-siding as a standard base requirement.

11.5.2.5 ROOF SHEATHING
See paragraph 12.8.7.1.

11.5.2.6 ROOF WATER
Roof water shall be diverted away from entrances and foundations. Splash blocks shall be provided under downspouts not connected to storm drainage system. Provide continuous gutters on fascia board at eaves of all units to collect all roof runoff. Gutters and downspouts shall be sized and designed in accordance with the SMACNA manual. Locate downspouts so that they do not drain onto steps, sidewalks or driveways.

11.5.3 EXTERIOR WALLS
Total wall section including framing, sheathing, insulation, waterproof barrier, and exterior finish shall satisfy all design requirements for fire protection, and wind resistance stipulated, or as required by the Uniform Building Code or local building codes.

11.5.4 EXTERIOR WALL FINISH
Factory finished steel siding, steel fascia, steel coil stock, and aluminum or steel soffit shall be used.

11.5.4.1 GENERAL
For exterior finish materials, emphasis should be placed on use of low maintenance and durable materials. Exterior finish materials, appurtenances and accessories shall be installed in strict accordance with the manufacturer's printed instructions for high wind conditions to avoid cancellation of factory warranty. Variances from these printed instructions shall have written approval from the manufacturer's authorized representative. Upon completion of installation, the contractor shall furnish manufacturer's certification that the system was installed in strict accordance with their printed instructions.

11.5.4.2 FACTORY FINISHED SOFFITS
Factory finished aluminum or steel soffits with venting are required.

11.5.4.3 FACTORY FINISHED FASCIA
Factory finished steel fascia is required.

11.5.5 BUILDING INTERIORS:

11.5.5.1 FLOORING TYPE
All rooms except foyers, utility rooms, interior storage rooms, bathrooms and kitchens shall have carpet. Provide foyers, utility rooms, interior storage rooms, bath(s) and kitchens with sheet vinyl flooring.

11.5.5.1.1 SHEET VINYL FLOORING
Sheet vinyl shall be installed using waterproof epoxy adhesive applied continuously at all seams, in accordance with the manufacturer's instructions. The manufacturer's recommended adhesive shall be used to coat the remainder of the sheet vinyl not coated by the waterproof epoxy adhesive. Use vinyl rolls in 12-foot widths, keeping seams to a minimum and out of high traffic areas. Asphalt floor tile and particleboard underlayments are not permitted.

11.5.5.1.2 CARPETING
Carpet shall be Class II, dense tufted cut pile. Carpet shall be treated for static control. Carpet flame spread rating shall conform to DOC FF1-70 and pass or exceed ASTM E-648-86 Critical Radiant Flux, ASTM E-662-79 Smoke Chamber Test, and have a greater than .45 watts/square CM, Class 1 rating. Carpet shall have synthetic (polypropylene) backing. A minimum of three colors will be selected from the manufacturers' standard. Carpet made from recycled/recovered materials must be 100% post consumer material.

Texture	Ounces/SY	Pile Density	Gauge	Stitches/Inch
Cut Pile	45	5480	1/10	12

Table 11.5.5.1.2 – Carpet Specifications

Carpet padding will be 100 percent synthetic slab rubber with synthetic facing, 22-pound minimum density, anti microbial and contain a moisture barrier. Carpet pad shall pass DOC FF1-70 (Pill Test), have a minimum of 90% compression on recovery test, and meet moderate commercial to extra heavy commercial standards. Carpet pad maybe made from new or recycled materials. Installation shall be in strict accordance with the carpet and padding manufacturers printed instructions.

11.5.5.2 BASEBOARDS
All baseboards shall be 2 3/4" wood except baths, foyers, kitchens, utility rooms, and interior storage rooms which shall be vinyl baseboards.

11.5.5.3 DRAFT STOPS AND FIRE RATED ENCLOSURES
Subdivide attic spaces as required by UBC and Life Safety Code, NFPA 101, latest edition. All enclosures that contain fire-producing equipment (such as water heaters) shall be enclosed in a one hour fire rated space.

11.5.5.4 WALLS AND CEILINGS
Walls separating duplex housing units (party walls) shall be masonry, staggered studs, or double wall and shall have a fire resistance rating of one hour per each wall, as determined in accordance with ASTM E119 and the UBC. Party walls shall extend from ground to underside of roof sheathing. Fire rated walls for multifamily configuration will be required in accordance with NFPA 101, Life Safety Code, and UBC requirements. Ceiling heights in all finished rooms shall be not less than 8 feet.

11.5.5.5 Not Used

11.5.5.6 SOUND ATTENUATION
Party walls between living units shall include sound attenuation with a minimum STC rating of 50 dB as determined in accordance with ASTM E90. Floor construction between living units shall be designed to provide the following sound transmission ratings as determined in accordance with ASTM E90 and E492.

Airborne sound STC - 52
Impact or tapping IIC - 52

11.5.5.7 GYPSUM WALLBOARD
Interior finish material, except as noted elsewhere, shall be ½-inch minimum gypsum wallboard. Provide water resistant gypsum wallboard on walls of all ¾ or full bathrooms (including behind all tub/shower surrounds.). Provide ½-inch Gypsum Ceiling Board or equivalent, or 5/8-inch gypsum board on ceilings of all ¾ or full

bathrooms. Type X, 5/8 inch gypsum board will be used between house and garage. Door between garage and house must be 20 minute, fire rated.

11.5.5.8 INSULATION
Thermal and sound insulation shall be any of those listed by Underwriters' Laboratories, Inc., as having a flame spread rating of 25 or less and a smoke development rating of 50 or less. A vapor barrier shall be provided on warm side of exterior walls, ceiling insulation and floors over unheated spaces. Insulation levels for all building components shall conform to the energy analysis required by paragraph 5.4.

11.5.5.9 CONDENSATION
All dead-air spaces shall be constructed so that ventilation is provided to dissipate any condensation occurring in these spaces.

11.5.5.10 SLAB ON GRADE
For slabs on grade a vapor barrier of 0.006 inch shall be installed between the gravel base and the slab.

11.5.5.11 KITCHEN CABINETS
Kitchen cabinets shall be factory manufactured. Countertops shall be a minimum of high pressure laminated plastic with heat resistant adhesive, fully formed with a continuous sheet of plastic combining a no drip bullnose edge and an integral coved backsplash with a 4 inch minimum height. Cabinets shall conform to the requirements of the custom grade and/or better or equal, except as noted below. Top mounted center drawer guides will not be acceptable. Cabinet catches shall be magnetic or hinges shall be spring loaded (or approved equal). The finished material of exposed fronts and ends of cabinets, door and drawer fronts shall be natural finish solid hardwood or hardwood plywood. Particle board will not be accepted. Wall cabinets shall be full height (extend to the ceiling with no furr-down) and have adjustable shelves. Cabinet units may either be framed or frameless self-supporting style.

11.5.6 DOORS

11.5.6.1 EXTERIOR DOORS
All exterior doors to main entrance and secondary entrance and doors between garages and living units shall be 36" wide, 1-3/4 inches thick of wood (solid core) or metal (foam filled) flush type (except the main entrance door - this shall be a panelized door) and shall meet NFPA 80 fire rating requirements. Exterior bulk storage doors shall be hollow metal flush type. Metal doors shall have edges formed (1" min. thickness) to give maximum rigidity and shall contain top and bottom horizontal stiffeners. All front entrance doors must have a transparent sidelight adjacent to door opening.

11.5.6.2 WEATHER STRIPPING/EXTERIOR THRESHOLDS
Weather stripping for heads and jambs of exterior doors shall be spring tension type, cold rolled spring of bronze, zinc, or other nonferrous metal. Vinyl magnetic weather stripping is acceptable for metal door. Exterior thresholds shall be nonferrous metal. The bottom of the door shall be fitted with a vinyl weather-stripping securely fastened to the bottom rail.

11.5.6.3 INTERIOR DOORS
Interior doors shall be 1-3/8 inches thick birch, stain grade, hollow core, flush or panel type. Hollow core wood or hardboard doors shall have a maximum 1/8" warp or twist in all grades.

11.5.6.4 INTERIOR THRESHOLDS
Provide interior thresholds of nonferrous metal, extruded vinyl, or hardwood where flooring materials or floor levels change.

11.5.6.5 CLOSET DOORS
Wardrobe closet doors shall be panel bi-fold, double doors, wood or hardboard (1-1/8" min. thickness). Hollow core panel wood or hardboard doors shall have a maximum 1/8" warp or twist in all grades. Closet doors shall be of same type and material as interior doors. Closet doors are required to have wood frame and casing trim and stop/head molding.

11.5.6.6 PATIO DOORS
Patio doors shall in pairs with one operable leaf and be of metal clad wood construction. Glazing shall be insulating constructed of two panes of tempered glass with an air space with a minimum "U" value of .52. Glass shall be sealed in door and back bedded with bedding compound or glazing beads. Weather stripping shall be as outlined herein. One door leaf shall include an internal locking mechanism that will allow the door to be secured into the header and floor.

11.5.6.7 ALUMINUM STORM DOORS
Insulated metal storm doors with baked-on-factory finish shall be provided for all exterior housing unit doors. Frames shall be a minimum of 1-inch thick and 2 ½ -inches wide. Aluminum alloy material shall be a minimum of 0.05 inches thick. Doors shall have bottom panels of solid material. Screening material shall be nonferrous and located at the top of the opening. Doors shall have closures and lockable latches and self storing screens. Latches shall be placed so as not to interfere with exterior door hardware.

11.5.6.8 STEEL INSULATED PANEL GARAGE DOORS
Insulated metal garage doors shall be provided for all housing units. Doors shall have closures and lockable latches. Each door shall have an exterior handle for operation. Individual one-half horsepower minimum, garage door openers will be provided for each garage door with two (2) remote openers.

11.5.7 HARDWARE

11.5.7.1 EXTERIOR LOCKSETS
Exterior locksets with dead-bolt lock shall comply with Federal specification FF-H-106C, Series 4000, Grade 2, Function F81, furnished with removable cores and four keys for each lockset. Trim for locksets shall be wrought construction. Deadbolt locksets on each unit shall be keyed alike. Each exterior door shall have 1-1/2 pair of butts and a door stop. Garage door to interior of unit shall also have an exterior lockset.

11.5.7.2 PRIVACY LATCHSETS
Interior privacy latch sets shall comply with Federal Specification FF-H-106C, Series 4000, Grade 2 or 3, Function F76. Interior passage shall comply with Series 4000, Grade 2 or 3, Function F75. Trim for latchsets shall be wrought construction. All interior doors shall have one pair of butts and a door stop. Only bathrooms and bedrooms shall have privacy locksets.

11.5.7.3 KEYING
All exterior locks shall be keyed with "Best"®-compatible 7-pin tumbler cores. The entire project shall be master-keyed with six sets of master keys furnished to the Contracting Officer. Locks for individual family units shall be keyed differently from any other housing unit. All exterior locks (including lock on door from garage to interior of housing unit and all exterior storage areas) on each housing unit, except the overhead garage door shall be keyed alike. Furnish two sets of keys for each lock.

11.5.7.4 DOOR CLOSERS
Door closers are required on all doors in fire rated walls, including all screen doors. Door closers in one hour-rated walls shall meet life-safety codes requirements.

11.5.8 WINDOWS

11.5.8.1 WINDOWS TYPES
Provide operable windows in all rooms according to code. Windows shall be wood clad with aluminum.

11.5.8.2 THERMAL STANDARDS
The total window "U" value shall include the "U" value of the glazing material and framing material together. This value for the windows shall not exceed .52.

11.5.8.3 METAL CLAD WOOD WINDOWS
Windows shall be aluminum clad wood. In living areas provide solid wood, paint grade sills with a minimum thickness of 3/4 inch. Wood or tile sills are to be provided for kitchens and baths. Weather stripping to be factory applied. All window wood components shall be painted prior to installation and have a minimum 10-year warranty.

11.5.8.4 SCREENS
Screens shall be provided for all operable windows and shall be the window manufacturer's standard design for use with the windows being provided. Screens shall be of nonferrous material.

11.5.8.5 DOUBLE GLAZING
As a minimum, all windows shall be double glazed.

11.5.8.6 TEMPERED SAFETY GLASS
Where glass extends to floor, to within 18 inches of the floor, or within 12 inches horizontal distance from any door it shall be fully tempered safety glass.

11.5.9 FINISHES

11.5.9.1 INTERIOR FINISHES
Interior surfaces shall be painted a minimum of one prime coat and two finish coats. All painted surfaces in kitchens, baths, laundry and utility rooms and all painted trim shall have semi-gloss finish. All other interior surfaces shall have a washable satin finish. Color will be WHITE. Interior doors shall be painted. Texture finish for walls and ceiling shall be limited to light orange peel from paint and paint roller only.

11.5.9.2 EXTERIOR FINISHES
Exterior painting, except for wood stains, is not acceptable. All exterior wood shall be wrapped with pre-finished coiled metal stock or factory finished metal covers to eliminate the need for recurring maintenance of painted surfaces. Exterior semi-transparent stains (two coats) will be acceptable where appropriate for wood, plywood, etc. All stain applications shall be in accordance with manufacturer recommendations with the exception that spray application will not be permitted. All finishes (sprayed or brushed on) shall contain no asbestos or lead-based ingredients, and be so certified by Contractor, and shall not be subject to spalling or flaking.

11.5.9.3 FEDERAL AND MILITARY SPECS
Paints shall meet or exceed Federal and Military Specifications and SCAQMB1113 Architectural Coatings (the latest current issuance) indicated in table

11.5.9.4 COLOR SELECTION
Colors shall be submitted by the Contractor and approved by Contracting Officer. Three (3) color schemes for siding shall be submitted.

11.5.9.5 LEAD FREE
All paints and stains, including color pigments, shall be lead-free.

11.5.9.6 BATHROOM WALLS
Exposed bathroom walls shall be provided with one prime coat and two semi gloss finish coats of WHITE paint floor to ceiling on remaining exposed walls.

11.6 ADAPTABILITY/ACCESSIBILITY
Five percent (5%) of each type unit shall be adaptable to accessibility standards, which means four 3-bedroom units under this contract. Adaptable means the structure shall be sized for accessibility, however, hardware and ramps will be installed later, if required. Adaptable units shall be single story units only. See Table 5.1.1 for design scheme requirements.

12.0 HOUSING UNIT STRUCTURAL DESIGN

12.1 GENERAL
The structural criteria established herein shall be used for structural loading, design and installation of all structural systems and foundations, including manufacturing, erection, supervision, testing, and quality assurance of the completed installation. The structural work generally consists of design, using the DESIGN LOADS and DESIGN CRITERIA below, and of construction of (for items not listed here use UBC requirements for design):

1. Foundation Walls and Footings.

2. Retaining Walls.
3. Load Bearing and Non-Load Bearing Walls
4. Vertical Framing Member
5. Horizontal Framing Members, including roof decks and diaphragms, roof beams and joist
6. Interconnection Details including all nailing and fastening requirements.
7. Special Conditions, such as expansion, construction, and control joints, and changes in floor levels.
8. Attachment provisions for architectural, mechanical, and electrical elements.

12.2 SELECTION OF STRUCTURAL SYSTEM

The overall structural system shall be selected based on durability, maintainability, and cost-effectiveness. The lateral support system shall be selected from conventional industry standard systems and shall be compatible with the vertical load carrying system.

12.3 DESIGN LOADS

12.3.1 STATIC OR DEAD LOADS

The structural system shall be designed and constructed to safely support all dead loads, permanent or temporary, including self weight, partitions, insulation, ceiling, floor covering, and all equipment that is fixed in position.

12.3.2 VERTICAL LIVE LOADS

12.3.2.1 Roofs shall be designed to support live loads, rain, and support wind loads including components and cladding, in accordance with the 1997 UBC edition. Other criteria are as follows:

Basic Wind Speed 80 mph
Minimum Roof Live Loads 30 psf
Table 12.3.2.1 – Roof Live Loads
Snowload per Sec 7 of ASCE 7-98

12.3.2.2 Floors shall be designed to support live loads as specified below:

Living Space 40 psf
Exterior, Porches, and Corridors 60 psf
Uninhabitable attics without storage 10 psf
Table 12.3.2.2 – Floor Live Loads

12.3.3 HORIZONTAL LOADS (ACTING INWARD OR OUTWARD)

The structural system, including components and cladding, shall be designed to resist wind loads in accordance with the Uniform Building Code. Anchoring systems that are exposed to view such as cables, straps, tie-downs, and turn buckles will not be permitted.

12.4 DESIGN CRITERIA

12.4.1 FOUNDATION DESIGN

The foundation shall be designed in accordance with the Contractor's Geotechnical Survey Report. Use pier and beam construction with exterior wall structure consisting of a spread footing with a concrete stem wall 30” above grade.

12.4.2 SHEAR WALL TOLERANCES
Walls, when used or required for lateral resistance to wind or earthquake, shall be considered bearing walls and shall have full foundations.

12.5 GENERAL DESIGN CRITERIA
The design drawings shall contain in the General Notes a list of the design loading criteria, a list of the strengths of the engineering materials used, the design soil values and any other data that would be pertinent to remodeling and/or future additions. Also, a description of the building structural system shall be given so that the construction contractor will know when the building is self-supporting.

12.6 CONCRETE DESIGN

12.6.1 GENERAL
All concrete shall have a minimum compressive strength of 3,000 pounds per square inch at 28 days. All foundation walls and footings shall be constructed of reinforced cast-in-place concrete. Do not use metal keys in horizontal and vertical concrete construction joints.

12.6.2 TESTING
Testing of concrete work shall be done at the Contractor's expense.

12.6.3 FORMS
Plywood, metal, metal-framed, aluminum, reinforced fiberglass, or plywood-faced, to provide continuous, straight, smooth, exposed surfaces.

12.6.4 REINFORCING MATERIALS
Reinforcing Bars: ASTM A615, Grade 60, deformed. Stirrups: Grade 40, deformed.

12.6.5 CONCRETE MATERIALS
Concrete materials shall comply with minimum specifications. In addition, Calcium Chloride will not be permitted. Fly Ash content shall not exceed 20 percent of cement content or pounds of fly ash per cubic yard of concrete, whichever is less.

12.6.6 VAPOR BARRIER
Provide under all interior floor slabs.

12.6.7 CURING COMPOUND
Liquid type membrane-forming curing compound is required.

12.6.8 PROPORTIONING AND DESIGN OF MIXES
Provide 3000 psi, 28-day compressive strength minimum, 5-7 percent entrained air, minimum 50 percent mix coarse aggregate by weight, slump per approved design specifications.

12.6.9 READY-MIX CONCRETE
Tested as per ASTM C94

12.6.10 FOUNDATIONS

12.6.10.1 HOUSE FOUNDATIONS
Garage slabs shall be 5-inch minimum thickness reinforced concrete. All slabs on grade shall be constructed with at least 4-inches of clean gravel between vapor barrier and grade.

12.6.10.2 OTHER FOUNDATIONS
Place in accordance with industry standards. In localities where extreme conditions of heat and/or dryness tend to produce excessive shrinkage, this area and joint spacing shall be decreased joints will not exceed 600 square feet, and the distance between crack control joints will not exceed 25 feet.

12.6.10.3 When thickened slabs are employed under column bases or partitions, crack control joints shall be offset from the thickened areas.

12.6.10.4 Patios shall be poured over minimum four (4) inch compacted granular base course. Positive drainage away from the unit will be ensured.

12.6.10.5 Horizontal runs of conduits and pipes will not be embedded in slabs on grade unless additional transverse reinforcement, or reinforcement and thickening, is provided over the pipe or conduit run. Aluminum conduit and pipes will not be embedded in any concrete structure.

12.7 STRUCTURAL STEEL DESIGN

12.7.1 WELDS
All weld types, weld, bolting layouts, bolt sizes, connection plates and members' sizes and locations and stiffener plate's sizes and locations shall be shown.

12.7.2 STEEL COLUMNS
Steel columns, if used, shall not be embedded over all or part of their height in CMU or concrete walls.

12.8 STRUCTURAL WOOD DESIGN

12.8.1 All metal connectors, bolting layouts, bolt sizes, screwing patterns, screw sizes, nailing patterns and nail sizes shall be shown in details and calculations. All members that are a part of the main vertical and/or lateral force resisting system must be completely detailed.

12.8.2 Exterior wood structural members that are exposed to view, such as columns, beams, and stair stringers shall be pressure treated lumber, decay resistant, and shall be wrapped with pre-finished coiled metal stock or factory finished metal covers.

12.8.3 MOISTURE CONTENT
All structural wood will have no more than 19% moisture content.

12.8.4 VERTICAL WALL FRAMING
Interior vertical bearing wall framing shall be no less than 2 x 4s at 16-inch centers with single sole and double top plates. Exterior vertical wall framing shall be 2 x 6. Non-bearing partitions shall be 2 x 4s at 16-inch centers with single top and sole plates.

12.8.5 STRUCTURAL FRAMING
Wood may be any grade and species listed in the Uniform Building Code which satisfy the structural requirements of the project.

12.8.6 BOARDS (less than 2 inches nominal thickness):

Exposed:	• No. 1 boards per SPIB rules. Select merchantable Boards per WCLIB rules. • Pressure treated for decay and paintable
Concealed:	• Southern Pine No 2 boards per SPIB rules or any species graded construction Boards per WCLIB or WWPA rules.

Table 12.8.6 – Board Grades

12.8.7 SHEATHING, GENERAL
The sheathing used shall have adequate and appropriate span ratings per the American Plywood Association (APA) (design specifications and construction guide) for the application and conditions proposed and shown on the contract drawings. Particleboard shall not be used in structural applications, such as roof sheathing, sub-floors, and structural sheathing or exterior concealed panels.

12.8.7.1 ROOF SHEATHING
Shall be 5/8-inch minimum thickness CDX. Roof sheathing must be either tongue and groove or use "H" clips between rafters and top chord of trusses. Glue lines shall not be considered for stress transfer. All roof sheathing laid shall be covered with felt by the end of each day or when a storm is approaching. Roof sheathing damaged due to moisture shall be replaced.

12.8.7.2 STRUCTURAL SHEATHING/EXTERIOR CONCEALED PANELS
Exposure shall be 1/2-inch minimum thickness. Square edges, solid blocking required under all edges.

12.8.8 INTERIOR CONCEALED PANELS
APA B-D interior, Grade 2 or better.

12.8.9 WOOD TRUSSES/FRAMING MEMBERS
Wood trusses and their load transfers shall be designed for the loads indicated. Joists and beams fabricated from laminated veneer lumber may be used.

12.9 RADON
The Contractor shall use construction techniques which will ensure that radon gas levels in the housing units can be maintained at or below the Environmental Protection Agency (EPA) guidelines.

12.9.1 TESTING
All tests shall be conducted using appropriate procedures approved by EPA and shall be performed by EPA or Colorado Department of Public Health and Environment certified personnel. The Contractor shall further perform a three month test of one house in ten during the heating season, within the first year after acceptance, using Alpha Track detectors. All units identified as in excess of the above level shall be promptly remediated.

12.9.2 WARRANTY
The Contractor shall warrant the level of radon does not exceed acceptable levels in any unit for a period of one year following acceptance by the Air Force, or following the testing and repair, whichever is greater.

12.9.3 CONSTRUCTION TECHNIQUES
The contractor shall employ construction techniques that help ensure that radon will be kept out of the housing units. EPA-approved techniques shall be used.

13.0 MECHANICAL, ELECTRICAL, AND PLUMBING

13.1 MECHANICAL HEATING, VENTILATION AND COOLING
The lowest life cycle cost of heating, ventilation and cooling equipment, considering all factors, shall be selected. Furnaces, air conditioning equipment, water heaters and water lines shall not be located in the attic. Metal ductwork, if used, shall conform to SMACNA standards. For the purpose of this Sample Task, assume $0.045/KWH and $0.04/BTU

13.1.1 EQUIVALENT EQUIPMENT
Equipment shall be equivalent to those systems in similarly priced energy efficient new housing constructed in the vicinity. All materials and equipment furnished shall be standard cataloged products of manufacturers regularly engaged in production of such materials and equipment and shall be manufacturers' latest standard design.

13.1.2 AIR CONDITIONING
Direct expansion (DX) condenser and compressor air conditioning systems for each housing unit shall be provided. All air conditioning systems shall deliver a Seasonal Energy Efficiency Rates (SEER) of not less than 10. Heat pumps are not authorized.

13.1.2.1 CONDENSATE DRAINS
Condensate drains from cooling coils shall be piped directly to drains prior to trap. Piping shall not run under concrete slabs or over floor slabs where they might be a trip hazard. The runs should be relatively straight and with adequate slope to prevent clogging. A common drain may be used for cooling unit and water heater when

located together in utility rooms. All units shall have safety pans or added safety drain which will run to a point that can be readily observed in case of stop-up of primary drain.

13.1.3 HEATING OUTPUT
Output of heating units should be enough to maintain interior design temperature of 75 degrees F (at an altitude of 5200 ft).

13.1.4 LIFE CYCLE COST CONSIDERATIONS
This project shall be developed for the source of heating and air conditioning, using gas or electric power, which will provide the least life cycle cost. Heat pumps shall not be considered. Warm air furnace efficiency shall be based on life cycle cost of the unit over a 15-year period.

13.1.5 SYSTEM DESIGN
Heating and air conditioning equipment shall be of the same manufacturer. Systems shall be designed, installed, balanced and adjusted to distribute heat and cooling to all habitable rooms, as well as to bathrooms, in proportion to the calculated heat losses/gains of these spaces. Heat shall also be provided to utility rooms, laundry rooms and other non-habitable areas as needed.

13.1.6 THERMOSTATS
Provide programmable, set back thermostats.

13.1.7 ROOM HEATERS/AIR CONDITIONERS
Room unit heaters, room A/C units, floor furnaces and heat lamps shall not be installed under this Task Order.

13.1.8 AIR DISTRIBUTION
Air flow ratings shall be provided for an elevation 5,200 feet above sea level. Provide systems with filters, plenums, and controls. Warm air supply outlets shall be registers with front fixed directional fins and volume dampers operable from the face of the register. It is required that supply outlets be located in floors on outside walls, positioned below the windows. In cases where contractor furnished carpet is installed, outlets may be floor mounted. Where ducts are located in crawl spaces/basements, exterior walls or attic spaces, provide a minimum of one-inch thick exterior duct insulation. Ducts shall be metal. Ducts installed beneath or in concrete slabs on grade will not be permitted. Return ducts shall be provided from all rooms except for kitchen and bathrooms.

13.1.9 MECHANICAL VENTILATION
Venting into vented joist space or attic space is not permitted. Furnace vents shall be run vertically through the roof.

13.1.9.1 EXHAUST FANS
Provide all bathrooms with an exhaust fan. Bathroom and kitchen fans shall be low-noise exhaust type ducted directly to the outside. All exhaust fans shall operate off their own switch, independent of switch for light fixture. Exhaust fans shall be complete with appropriate wall caps, eave vents, or roof jacks, and self-closing back draft dampers.

13.1.9.1.1 BATHROOMS
Bathroom exhaust fans, wall or ceiling mounted, shall be sized to give not less than 10 air changes per hour in the space to be ventilated.

13.1.9.1.2 KITCHENS
A metal range hood with 2-speed low noise exhaust fan and light is required in each kitchen. The fan shall discharge to the outside with a back-draft damper. The length of hood shall be not less than the width of the range and shall be equipped with removable, washable type filter. The range hood exhaust fan shall have a capacity of not less than 50 cfm.

13.1.9.1.3 FAN GRILLE
Fan grille shall be removable or hinged to allow access to fans and motors for replacement and repairs.

13.1.9.1.4 ATTIC VENTILATION
Roof top units shall not be used. Ventilation grills shall be along the soffits and gable end walls (color coordinate finish colors, baked on enamel or anodized factory finished, no field painting shall be allowed).

13.1.9.2 DRYER VENTS
Dryer vents (4" diameter) discharging to the outside shall be provided for connection to all clothes dryers (one dryer to a vent). The vents shall be rigid, with metal cap and back draft damper (flexible ducts shall not be used) and painted to match the siding. Directional changes shall be made with right angle elbows having a 6-inch minimum centerline radius. Not more than two elbows shall be used to preclude lint stoppage and to insure adequate drainage of condensed water vapor. Joints shall be riveted. Vent pipes shall take the shortest practical route to the outside and shall have a total length in accordance with the Uniform Mechanical Code. Vents running vertically shall have a lint clean out panel. Dryer vents shall not exhaust within 15 feet of the air conditioning compressor units, fresh air intakes, or entry doors.

13.2 ELECTRICAL (INTERIOR)
Comply with the requirements of the AFFHG and the NEC, current version. All materials, equipment, fixtures, and other appurtenances shall comply with the applicable Underwriters' Laboratories, Inc., standards or applicable standards of a similar independent testing organization. Overcurrent protection shall be provided for each building service conductor and for each unit's service entrance conductor and equipment.

13.2.1 SERVICE ENTRANCE
Panels shall be enclosed or sight screened. Panel boards shall be painted and furnished with main breakers. Panel board doors shall have flush one-piece fronts. In hallways, panel boards shall be recessed. In other locations they may be surface mounted. Provide at least four spaces (without breakers) in panel boards.

13.2.3 METERING
Individual housing units will not be metered.

13.2.4 PANEL LOCATIONS
Unit panel shall be located in the utility room, laundry room, or inside an attached garage or basement. Panels shall be recessed when located in room with finished walls.

13.2.5 BRANCH CIRCUITS
Branch circuit conductors and interior feeders shall be copper. Service entrance conductors from transformer to meter socket shall be copper. Conductors No. 8 and larger shall be stranded. No conductors shall be routed on the exterior of the housing unit except for service entrance conductors (installed in schedule 80 PVC).

13.2.6 LIGHTING:

13.2.6.1 GENERAL
Lighting and convenience outlets shall be on separate circuits. Convenience outlets on opposite sides of party walls shall be offset. Convenience outlets shall be grounded and located in walls and partitions.

13.2.6.2 SEPARATE CIRCUITS
A separate branch circuit shall be provided and sized accordingly for each of the following: clothes dryer, clothes washer, garbage disposal, small appliance outlets (minimum of two circuits required above kitchen counter tops), freezer, refrigerator, condensing unit, electric water heater (if provided), dishwasher, microwave, and range. A duplex convenience outlet shall be provided for an occupant owned clothes washer.

13.2.7 EXTERIOR OUTLETS
Provide a minimum of one lighting fixture and one exterior duplex outlet at the garage, patio, and front porch. Light fixtures at patio and front porch areas shall be switched by the access door to that area. Install motion detecting light at front porch with adjustable sensor. Garage lighting shall be controlled from inside the housing unit, adjacent the door nearest to the garage. All outlets to be weatherproof ground fault protected (GFCI).

13.2.8 ENTRANCE LIGHTING
Provide an exterior metal lighting fixture for door entrances switched from the interior.

13.2.9 LAUNDRY AREA
One GFCI outlet for ironing shall be provided in addition to the washer and dryer requirements.

13.2.10 LIGHTING FIXTURES
Provide wall-switch operated ceiling-light fixtures in all rooms including kitchen, dining room, bathrooms (provide light above vanity and on ceiling), hallways, stairs, bedrooms and basements/utility rooms. Provide switched compact fluorescent task lighting directly above sink in addition to general kitchen lighting.

13.2.11 WALK-IN CLOSET/BULK STORAGE LIGHTING
Walk-in closets, interior and exterior bulk storage rooms shall be provided with lighting fixtures, wall switch operated.

13.2.12 BATHROOM SWITCHES
Electrical switches shall not be accessible from either tub or showers.

13.2.13 WALL HEATER
Not permitted in any room.

13.2.14 BATHROOM RECEPTACLES
A convenience GFCI duplex wall receptacle near the lavatory shall be provided in each bathroom. No receptacle is to be provided in the light fixture and/or the light switch.

13.2.15 KITCHEN RECEPTACLES
Provide a minimum of two circuits of GFCI receptacles above the countertop to accommodate a variety of small appliances.

13.2.16 FLUORESCENT LIGHTING
Interior fluorescent light fixtures may be installed in selected locations such as kitchens, bathrooms, utility rooms and work or service areas. Fluorescent fixtures should use compatible electronic ballast and lamps. In addition, "mirrored" specular reflector is encouraged.

13.2.17 CONVENIENCE OUTLETS
Provide duplex receptacles as required by the AFFHG.

13.2.18 RECESSED LIGHT FIXTURES
Fixtures on ceilings less than 7’-6" above the floor shall be recessed flush type unless recessed lighting fixtures would result in a penetration of the infiltration membrane between the unit interior and exterior and adjoining unit. Recessed fixtures must be rated accordingly per code requirements.

13.2.19 SMOKE AND CARBON MONOXIDE DETECTORS
Smoke detectors shall be wired to the house current and located in accordance with NFPA standards. Smoke detectors shall be hard wired to an unswitched 120-volt AC circuit; when possible, provide with a battery back-up. Smoke detectors shall conform to UL Standard 268 and shall be installed on the ceiling not closer than 4 inches from a wall. Each sleeping area shall be protected by one detector located in each bedroom. Smoke detectors shall not be located closer than three feet from the kitchen or bathroom entry, nor closer than three feet from the register from a heating or cooling system. Smoke detectors shall be connected to allow all of them to sound when one is activated. Provide hard wired carbon monoxide (CO) detectors with battery backup and a detection element service life not less than 10 years. Provide CO detector(s) in accordance with manufacturer recommendations to include a minimum of one CO detector per housing unit near the sleeping areas and a minimum of one detector per floor. Multiple CO detectors shall be connected to allow all of them to sound when one is activated.

13.2.20 OCCUPANT OWNED FREEZER
A dedicated electrical outlet shall be provided for occupant owned freezer.

13.2.21 TELEPHONE
Each unit shall be pre-wired to a central panel. Conductors, wiring method, and method of termination shall be as required by the local telephone company. See paragraph 8.6.

13.2.22 TELEVISION
See paragraph 8.7.

13.2.23 ELECTRICAL EQUIPMENT REQUIREMENTS:

13.2.23.1 120 VOLT, 60 HZ EQUIPMENT:

- Refrigerators
- Garbage Disposals: minimum 1/2 horsepower capacity
- Dishwashers
- Smoke Detectors
- CO Detector
- Clothes Washers
- Microwave Oven

13.2.23.2 240 VOLT, 60 HZ EQUIPMENT:

- Clothes dryers
- Cooking range
- Air condensing unit

13.2.24 ELECTRICAL EQUIPMENT CONNECTIONS
The contractor shall provide appropriate connections, including electric outlets as required, and permanently connect the equipment. A wall switch above and to the right of kitchen sink and an electrical outlet under the sink shall be provided for the garbage disposal. An under counter outlet shall be provided for dishwasher. Provide an electric cord and plug on each garbage disposal, dishwasher and range. An electrical outlet shall be provided for the clock/timer (electronic igniter, if gas) and range light and a separate 240 volt outlet for the range (if electric).

13.2.25 KITCHEN OUTLETS
All wall outlets above countertops in kitchens shall have GFCI as required by code.

13.3 PLUMBING

13.3.1 WATER SUPPLIES
Provide water supply with valve to the Refrigerator location.

13.3.2 NATURAL GAS
The interior gas plumbing, from the low pressure regulator to the equipment, shall be wrought iron or steel, and the fittings shall be malleable iron. Piping connections to all gas burning equipment shall be made with rigid pipe and fittings. The use of semi-rigid tubing and flexible gas connectors to connect appliances to the piping system shall be permitted in accordance with seismic zone 1 criteria.

13.3.3 GAS INSTALLATION
The complete piping installation shall conform in all respects with Local Gas Code.

13.3.3.1 SERVICE LINE VALVES
Provide a separate service for each living unit. An easily accessible service line valve and a service regulator shall be installed outside the building on each service line.

13.3.3.2 SHUT OFF VALVES
A gas shut off valve and coupling shall be installed in an easily accessible place in the gas line to each equipment item.

13.3.3.3 METERING
Individual housing units will not be metered.

13.3.4 PLUMBING FIXTURES AND FITTINGS
All plumbing fixtures and equipment shall be the manufacturer's latest standard design. All piping in finished areas will be concealed. Stops will be provided on all water supply lines to all plumbing fixtures, except for tubs and showers. Trim for plumbing fixtures shall not have alloys exceeding 16 percent zinc. Aluminum trim shall not be permitted. All faucets shall be of metal construction and of the same design in all bathrooms. It is preferable that faucets be single control type with one handle which will regulate volume and hot and cold mixing. Seals and seats of single control faucets shall be combined in one replaceable cartridge designed to be interchangeable with all lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as part of a replaceable valve unit.

13.3.4.1 WATER CLOSETS:
Tank flush valves shall be either vertically or internally guided type or flapper with integral float. Swing, non float types are not acceptable.

13.3.4.2 LAVATORIES:
Counter top units shall be rimless type (without rings); overlap top mounted only, or if slab counters are provided, under counter mounted type are acceptable. All lavatories shall be vitreous china or porcelain enamel on cast iron or steel and shall have pop-up drains.

13.3.4.3 BATHTUBS
Bathtub/shower shall be one-piece fiberglass surround with water resistant gypsum wallboard backing on all sides. Shower/bath combination shall be controlled by a diverter valve. Waste fitting Type II pop-up, concealed with all parts removable and renewable through the overflow and outlet openings in the tub. Shower curtain rods/hardware are required. Plastic to metal threaded parts on shower heads are not allowed.

13.3.4.4 KITCHEN SINKS
Double bowl kitchen sinks shall be stainless steel, 20 gauge minimum, seamless drawn, satin finish, and sound deadened. Minimum size bowl shall be 14" x 16" x 8" deep each. All sinks are to be self mounting without mounting rings, complete with cup strainer and plug.

13.3.4.5 CLOTHES WASHER
Drainage and hot and cold water piping shall be provided for automatic clothes washers. The drainage shall be through a standpipe of 2'-10" minimum height from the floor, 2 inches minimum size, trapped, with bottom of trap a minimum of 4 inches above the floor. The piping faucets and electrical outlets for washer and dryer shall be provided in standard manufactured recessed wall box with single face plate. It shall be placed at a height convenient for the washer hoses connection, but will be covered from view by the height of the clothes washer. Box for electrical outlet shall be separate from box for water pipes. Boxes constructed of sheet steel shall have a corrosion resistant epoxy enamel finish.

13.3.4.6 SHOCK ABSORBERS
Shock absorber units to control water hammer shall be provided on supply lines to the clothes washers. Air Chambers are not acceptable.

13.3.4.7 HOSE BIBS (EXTERIOR)
Provide frost-proof hose bibs at the front and back of each living unit.

13.3.4.8 PIPING LOCATIONS
All plumbing piping running in crawl spaces or exterior walls shall be installed with wrapped insulation of 3/4 inch thick fiberglass with vapor barrier jacket.

13.3.4.9 MAJOR APPLIANCE PLUMBING CONNECTIONS
The Contractor shall provide appropriate connections for dishwasher, refrigerator, garbage disposal, dryer, clothes washers, range, and water heater.

13.3.4.10 WATER HEATER
A pressure/temperature relief valve and drain for the water heater shall be provided. Provide gas water heaters with standing pilot flame rated for high altitude.

13.3.4.11 DISHWASHER
A water line and air gap fitting drain shall be provided for electric dishwasher. Drain from the dishwasher shall be routed through the garbage disposal.

13.3.4.12 REFRIGERATORS
A water line with cut-off valve shall be provided for refrigerator icemaker.

14.0 EQUIPMENT

14.1 AVAILABILITY
Material and equipment shall be furnished by the contractor unless specified otherwise.

14.2 MAJOR APPLIANCES
The Contractor shall furnish and/or install the following items of equipment.

14.2.1 CONTRACTOR FURNISHED/CONTRACTOR INSTALLED APPLIANCES:

14.2.1.1 GARBAGE DISPOSALS
Garbage disposals shall as a minimum be 1/2 horsepower with sound baffle/muffling. Unit shall be 115 volt, single phase with a stainless steel grinding chamber. Provide an electrical switch next to the sink for operation of the unit.

14.2.1.2 DISHWASHERS
Shall be designed as an automatic 24 inch wide under the counter unit with drain air gap. Major components shall be: sound-absorbing exterior insulation, full extension upper and lower racks with removable silverware basket, not less than two wash cycles with not less than two wash levels, food pulverizer, energy saving drying cycle and water saving cycle, operable at water pressures from 20 to 120 psi, requiring not more than 12.0 gallons of water for normal wash cycle. The following additional accessories/features are required: extra hot wash temperature selection, push button controls, automatic rinsing aid and detergent dispenser, door front and lower access panels shall have reversible panels (white must be one of the colors).

14.2.1.3 WATER HEATERS
The Contractor shall provide high recovery gas water heaters with a minimum 50-gallon capacity and sized to accommodate addition demand loads based upon floor plan configurations developed in response to the RFP.

14.2.2 CONTRACTOR FURNISHED/CONTRACTOR INSTALLED APPLIANCES:

14.2.2.1 REFRIGERATORS
Shall be a minimum 20.5 cu. ft. for 3 and 4 bedroom units with Grade A door, top freezer, automatic defrost food compartment, and ice maker. Provide the spectrum of colors within a white tone for selection by the government. Contractor shall be responsible for connecting icemaker connection and supplying connection line.

14.2.2.2 RANGES
As a minimum, ranges shall be type I (single oven), Style 2 (slide-in), Size 30 (30-inch width). Units shall have clock/timer and oven light. Provide the color to match refrigerator selection. Provide proper provisions to accommodate both gas and electric ranges.

14.3 GAS APPLIANCES
All gas appliances to be ignited by AGA approved electronic igniters, except water heaters.

14.4 SPACE AND CONNECTIONS
The Contractor shall provide space to accommodate the above equipment and shall provide appropriate connections, including electric outlet as required and shall hook up the equipment.

15.0 ENERGY REQUIREMENTS

15.1 ENERGY CONSUMPTION ANALYSIS

This project is subject to Department of Defense energy use limitations. Comply with the Design Guide for Military Family Housing: Energy-Efficient Revitalization and New Construction. The worksheet within the guide can be used for calculations required within this scope.

15.2 ENERGY EFFICIENCY AND WATER CONSERVATION AT FEDERAL FACILITIES

Reference is made to Presidential memorandum: Environmentally and Economically Beneficial Practices on Federal Landscape Grounds, April 26, 1994: DUSD (ES)/PP Memorandum of September 23, 1994, same subject. During the design of this project, consider the following mandated requirements. Design facilities to minimize life-cycle costs of the facility by utilizing energy efficient, water conservation, or solar or other renewable energy technology.

16.0 TESTING

16.1 INFILTRATION

Air infiltration testing shall be performed as outlined below.

16.2 LEAKAGE PERFORMANCE TESTING

Randomly selected housing units shall be positively pressurized to determine the air leakage rate through the building envelope. The work shall be performed by certified firms.

17.0 DEMOLITION: NOT USED

18.0 SALVAGE: NOT USED

19.0 ENHANCEMENTS: NOT USED

20.0 ENVIRONMENTAL REQUIREMENTS

20.1 COMPLIANCE

All Contractors are responsible for ensuring that their design, construction, transportation, storage and disposal comply with Federal, and applicable State, Local Laws and regulations.

20.2 COORDINATION

The Contractor shall prepare and submit plans, specifications, and permit requests to the contracting officer for this task.

20.3 CERTIFICATION THAT ALL NEW CONSTRUCTION IS FREE AND CLEAR OF ASBESTOS MATERIALS AND LEAD

The Contractor is prohibited from using any asbestos construction materials or lead in completing this project. At the conclusion of this project, the Contractor will be required to provide written certification to the Contracting Officer that this is true and correct.

21.0 GOVERNMENT ACCEPTANCE

Contractor shall turn over completed new housing units to the Contracting Officer at a minimum of 10 units at a time and as much as possible in "whole block" lots in a manner acceptable to the Government.

CHAPTER 2
DESIGN
1.0 DESCRIPTION OF WORK

1.1 GENERAL
Following construction award, the contract will be conducted in two stages. The first stage is design, and the second stage is construction.

1.2 DESIGN
Design will consist of all site investigations and design work associated with preparing complete contract documents for this project SOW and elsewhere in the RFP. The Contractor will also be required to submit partial design documents for review as described in paragraph 2.2. The Contractor shall be required to attend certain review meetings described in paragraph 2.3. After contract award the Government will provide drawing sheet file numbers. The Contractor will be required to furnish a coordinated interior and exterior decor and color scheme including color boards. A professional quality, computer generated color rendering of the three and four bedroom building of this project will be required.

1.3. CONSTRUCTION
Construction will be developed from an approved design. The Contractor will be responsible for providing all material, equipment and labor required to construct a complete and usable facility. The Contractor will be required to provide quality control; submittal control/approval; compliance with all applicable codes and regulations; construction management; and environmental control as described in this SOW and elsewhere in the RFP.

1.4. DESIGN AND CONSTRUCTION
Construction is not to commence until the Government has reviewed and approved the plans and specifications for construction. The responsibility for a total design based upon approved proposal in accordance with the contract will remain with the Contractor.

2.0 DESIGN REQUIREMENTS

2.1. SITE INVESTIGATION AND DESIGN: Not Used

2.2. DESIGN SUBMITTALS

2.2.1. DESIGN DEVELOPMENT SUBMITTAL:
A. Based on the contractor's proposal and comments furnished by the Government and data contained and in the RFP, the Contractor will develop the Proposal design to DD contract documents including drawings, specifications, design analysis, finish schedules, and sample material/color boards. This will include but not be limited to the following:

1. Cover Sheet
2. Index of Drawings G series
3. Drawings: per Chapter 1.

B. Specifications: Book bound and in CSI format to allow Government review to determine compliance with the SOW.
C. Design Analysis: A design analysis covering architectural, structural, plumbing systems and compliance with codes will be submitted by the Contractor. The analysis is to be a book on 8-1/2" x 11" white paper which has been bound. As a requirement of the design analysis, two (2) copies of interior and exterior color boards/notebooks will be included.
D. If the civil design is approved, a separate Notice to Proceed (NTP) with that portion of the work may be issued by the contracting officer.

2.2.2. UNCHECKED PRE-FINAL DESIGN SUBMITTAL:
A. The unchecked final design documents will be the DD design refined and completed to include the review comments resulting from the DD design review.
B. The final design will include enough detailing to leave no question as to how assembly is intended.

2.2.3. CORRECTED FINAL DESIGN SUBMITTAL:

The corrected final contract documents will include the unchecked pre-final design (90%) documents with all review comments incorporated and will specifically include:

A. Quantity and size of submittals (half size or full size) with appropriate recipient to be determined.

B. Two (2) copies of the Computer Aided Drafting (CAD) electronic computer products at 100% design. The computer products are to be updated during construction by the Contractor and furnished to the Contracting Officer at completion of construction. A schema (layering legend) will be provided for all CAD drawings. The type of information that should be included on the schema is what layers are used for HVAC, electrical, plumbing, etc. and what colors and pens are used for each. Provide a listing of all external reference (XREF) files and their location. Acceptable CAD formats listed below. CAD drawings files stored on CD-ROM media. All drawing files will be 100% compatible with AutoCAD® Release 14 software.

2.2.4. ARCHITECTURAL RENDERING AND PRESENTATION DRAWINGS:

At the time of submission of the corrected final design documents, the Contractor shall provide and deliver to the Contracting Officer, a professionally produced and framed color computer rendering of the project. In addition to the original framed rendering, the Contractor will provide two full-size color photographic print of the rendering, mounted and framed under the same requirements as the original rendering, five (5) full-size (20" x 28") duplicate color copies of the rendering, computer files of the rendering in its original file format as well as a file converted to the PDF format. Five color plots of the presentation quality floor plans and elevations shall be submitted in addition to the renderings and computer products.

(THIS IS NOT REQUIRED FOR THE SAMPLE TASK SOLICITATION RESPONSE)

2.3. REVIEWS, SUBMITTALS, AND CONFERENCES

2.3.1. DESIGN REVIEWS:

A. The Contractor shall complete the DD design and submit data listed in paragraph 2.2.1 within the first one-third of the contract performance period for design. A DD design review will be held by the Government on-site approximately 21 days after receipt of the DD design submittal. The Contractor is required to attend this review meeting and have representatives from each major engineering discipline present.

B. The Contractor shall complete the unchecked pre-final design documents and mail submittals to the agencies listed in paragraph 2.3.2 to arrive four (4) weeks prior to the proposed completion date for design. A final design review meeting will be held on-site within 21 days of receipt by the Government of the pre-final design documents submittal.

C. Approximately fourteen days (14) after receipt of the pre-final design documents (100% back-check) review comments, the Contractor shall submit to the Contracting Officer the documents listed in paragraph 2.2.3.

2.3.2. SUBMITTALS:

The number of copies to be mailed directly to the agencies in accordance with (Figure 2.3.2), including transmittal letter to Contracting Office.

2.3.3. CONFERENCES:

A. A Pre-Performance Conference will be held on-site as indicated in the contract.

B. In addition to normal design review conferences, coordination conferences may be held from time to time as required. The contractor may request such conferences when it is deemed necessary by both parties to clarify the work or expedite the preparation of plans, specifications or construction.

C. The Contractor shall be responsible for making minutes of any conversations and minutes of any meeting with Government personnel concerning this project and forward one copy of these minutes to each party concerned and one copy to the Contracting Officer within seven (7) days.

D. Pre-performance, DD and pre-final Review Conferences, 100% back-check, and 100% Review Conference (if held) will be on-site.

E. Contractor transportation costs for attending all conferences/reviews and meetings shall be included in the Contractor's Proposal.

FIGURE 2.3.2
SUBMITTAL REQUIREMENTS

Agency	Schematic or CD	DD	Pre-final	Final
AFCEE/DCM Mr. Charles Ondrej	1* & 1**	1*	1* & 1**	1*, 1**, & 1a
311 HSW/PKVH Ms. Maria Ng	Transmittal Only	Transmittal Only	Transmittal Only	Transmittal Only

Title II Consultants 1*
* Full size drawings plus specifications and design analysis.
** Half size drawings plus specifications and design analysis.
a One copy of CAD material and specifications in electronic form.

CHAPTER 3
CONSTRUCTION REQUIREMENTS

1.0 GENERAL
Following construction award, the contract will be conducted in two stages. The first stage is design, and the second stage is construction. This section explains the procedures for construction management and inspection for the two-step sample procurement of 84 Military Family Housing Units on government owned property in Denver, Colorado.

1.1 FUNCTIONS AND RESPONSIBILITIES OF THE ADMINISTRATIVE CONTRACTING OFFICER (ACO)
The ACO as per the contracting documents has the authority to make changes to the contract.

1.2 TECHNICAL REPRESENTATIVE
The Government technical contract representative is designated as the Contracting Officer Representative (COR). The COR does not have the authority to make changes to the contract. This designation includes, but is not limited, to the following specific functions of this contract:

A. Technical administration.
B. Recommendation of approval of shop drawings, samples, and materials.
C. Monitor work operations.

2.0 CONSTRUCTION MANAGEMENT

2.1 PROJECT CONSTRUCTION MEETINGS

2.1.1 PRECONSTRUCTION CONFERENCE
Prior to the commencement of construction, a conference will be held on-site to acquaint the participants with the general plan of contract administration and requirements under which the construction operations will proceed, and also to inform the Contractor, in detail, of his obligations concerning preferences and equal opportunity. Items for discussion will include, but not be limited to:

A. Provision for and location of field offices;
B. Location for project sign to be erected by the Contractor (see paragraph 2.4.14);
C. Coordination and approval of haul routes and disposal sites;
D. Timely submission and processing of submittals for material, equipment, and shop drawings;
E. Procedure for reporting deficiencies and insuring correction;
F. Contractor quality control plan;
G. Construction progress chart and payments;
H. Labor standards;
I. Insurance requirements;
J. Equal employment;
K. Safety; and
L. Environmental protection.

2.1.2 JOB MEETINGS
The COR and the Contractor will hold weekly project meetings at the Contractor's site office for the purpose of discussing and resolving job issues. In addition, they provide an opportunity to recognize and cope with potential problem areas before they materialize.

2.1.3 RECORD OF MEETINGS
The Contractor is responsible for keeping typed minutes of all meetings and making distribution of these minutes within 3 calendar days to all the agencies represented at the meetings. A list of pending/open items shall be included as a separate attachment.

2.2. SUBMITTALS

2.2.1. SHOP DRAWINGS AND MATERIALS SUBMITTAL CONTROL FORM (AF Form 3000)

Within 15 days after receipt of NTP with construction, the Contractor shall submit to the Contracting Officer, in electronic format, documentation listing all submittal items. The scheduled need dates must be recorded on the document for each item for control purposes. Scheduling shall be coordinated with the approved construction progress schedule.

2.2.2. SUBMITTALS OF SHOP DRAWINGS AND OPERATIONS AND MAINTENANCE DATA

This section, in addition to the provisions set forth under the CONTRACT CLAUSES and other sections of the DESIGN REQUIREMENTS, covers preparation and submittal of shop drawings, operations and maintenance data, and other materials required to demonstrate contract compliance; and prescribes review and approval procedures.

A. SHOP DRAWINGS: A shop drawing is a Contractor's or manufacturer's drawing, brochure, sample, certificate, calculation, warranty, or other submittal which provides detail for construction and quality control of permanent work.

1. SUBMITTAL OF SHOP DRAWINGS: AF Form 3000 shall be used to transmit shop drawings.

2. APPROVAL OF SHOP DRAWINGS: All shop drawings shall be Contractor approved; however, certain specified submittals will also require the Contracting Officer approval. Contracting Officer's approval is required when submittals:

- are specifically identified in design development and technical provisions,
- depict deviation from the contract (e.g., an "or equal" decision), or
- involve equipment compatibility to provide an operational system.

3. SHOP DRAWINGS APPROVED BY CONTRACTOR: Three copies of shop drawings not requiring Contracting Officer approval shall be submitted prior to delivery of the material or equipment to the jobsite. Submittals will be monitored and spot checks will be made.

4. SHOP DRAWINGS APPROVED BY CONTRACTING OFFICER: Five copies of all shop drawings requiring Contracting Officer approval shall be submitted. Submittals will be reviewed and processed as follows:

- Approved as Submitted (Action Code "A"). Shop drawings which can be approved without correction will be stamped "Approved" and two prints or two copies of catalog and other printed data will be returned to the Contractor.
- Approved Except as Noted (Action Code "B"). Shop drawings only having minor discrepancies will be annotated in red to indicate necessary corrections. Marked material will be stamped "Approved Except as Noted" and returned to the Contractor for correction. Distribution will be the same as for "Approved as Submitted (Action Code "A") submittals.
- Approved Except as Noted (Action Code "C" Resubmission Required). Shop drawings which are incomplete or require more than minor corrections will be annotated in red to indicate necessary corrections. Marked material will be stamped "Approved Except as Noted - Resubmission Required" and returned to the Contractor for correction. Two prints, or two copies of catalog and other printed data, will be returned to the Contractor.
- Disapproved (Action Code "E"). Shop drawings which are fundamentally in error, cover wrong equipment or construction, or require extensive corrections, will be returned to the Contractor stamped "Disapproved." An explanation will be furnished on the submittal material or on AF Form 3000 indicating reason for disapproval. Distribution will be the same as for "Approved Except as Noted (Action Code "C"-Resubmission Required)" submittals.
- Re-submittal will not be required for shop drawings stamped "Approved as Submitted (Action Code "A") or "Approved Except as Noted (Action Code "B")" unless subsequent changes are made by Contractor or a contract modification. For shop drawings stamped "Approved Except as Noted (Action Code "C"-Resubmission Required)" or "Disapproved (Action Code "E")," Contractor shall make corrections required, note any changes by dating the revisions to correspond with the change request date, and promptly resubmit the corrected material. Government costs incurred after the first re-submittal will be charged to the Contractor.

5. DRAWINGS: Each drawing shall be "C" (17x 22) with a title block in lower right hand corner and a 3 by 4 inch clear area adjacent. Title block shall contain subcontractor's or fabricator's name, contract number, description of item(s), and a revision block. Where drawings are submitted for assemblies of more than one piece of equipment or systems of components dependent on each other for compatible characteristics, complete information shall be submitted on all such related components at the same

time. Contractor shall ensure that information is complete and that sequence of drawing submittal is such that all information is available for reviewing each drawing. Drawings for all items and equipment of special manufacture or fabrication shall consist of complete assembly and detail drawings. All revisions after initial submittal shall be shown by number, date, and subject in revision block.
6. PRINTED MATERIAL: All requirements for shop drawings shall apply to catalog cuts, illustrations, printed specifications, or other data submitted, except that the 3 by 4 inch clear area adjacent to the title block is not mandatory. Inapplicable portions shall be marked out and applicable items such as model numbers, sizes, and accessories shall be indicated.

B. OPERATIONS AND MAINTENANCE DATA
Instructions shall be prepared and assembled into a manual for all equipment furnished. The manual shall cover operation, maintenance, dismantling, assembling, adjusting, start-up and shut-down, and identification of all parts for replacements. Each system or piece of equipment shall be covered in a single manual regardless of the number of suppliers or subcontractors involved. Data submitted for the manual is in addition to that furnished as shop drawings. Five copies of operation and maintenance (O&M) data for each electrical, mechanical, and electrical/mechanical system or equipment shall be submitted for approval prior to binding the information in the manual. If "Returned for Correction," Contractor shall resubmit three copies of corrected data. The Contractor shall assemble five complete bound O&M manuals, each containing all of the approved O&M data.

C. CONTRACTOR'S FILES
Contractor shall maintain "Approved (Action Code "A") and "Approved Except as Noted (Action Code "B")" drawing files in fabrication shops and at field sites for Government use.

2.2.3. CERTIFICATES OF COMPLIANCE
Certificates required for demonstrating proof of compliance of materials with specification requirements shall be submitted in accordance with paragraph 2.2.2, Submittals of Shop Drawings and Operations and Maintenance Data.

2.2.4. MATERIALS, FIXTURES, AND EQUIPMENT LISTS
As soon as practicable and before any material or equipment is purchased, the Contractor shall submit to the Contracting Officer a complete list of materials, fixtures, and equipment to be incorporated into the work.

2.2.5. SUBMITTAL OF AS-BUILT DRAWINGS AND SPECIFICATIONS
The Contractor shall submit to the Contracting Officer, for approval, one full size set of as-built drawings, marked-up as actually constructed, marked-up specifications complete with amendments, and any change orders. As-built drawings shall include mark-up of changes and revisions of all related sections, details, plans and elevations, notes, legends, etc., and, if necessary, sketches of enlarged details all done in a clear and precise manner. As-built drawings shall also note the type of material used whenever material option is given in the specification.

2.3. INSPECTION AND TESTING
Inspection will be accomplished by the Contractor in accordance with the specified quality control program. Prior to start of construction, the Contractor will submit his plan for quality control, which will ensure sufficient inspection and test of all items of work, including that of subcontractors, to ensure conformance to the Contractor's plans and specifications with respect to the materials, workmanship, construction finish, and functional performance. The Contractor shall perform all quality control inspection and/or testing in accordance with the provisions specified in paragraph 3 of this Chapter, CONSTRUCTION QUALITY CONTROL.

2.4. CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

2.4.1. CONTRACTOR'S EMPLOYEE RESTRICTIONS
Contractor's employees shall be restricted to areas within the immediate vicinity of this work plus direct routes to and from the site as may be approved during the Pre-construction Conference. Each Contractor employee shall have in possession, while on the installation, an approved identification pass.

2.4.2. OCCUPATIONAL, SAFETY AND HEALTH ACT
Contractors shall comply with OSHA Standards applicable to construction under this task.

2.4.3. CATALYTIC CONVERTERS
No vehicle equipped with a catalytic converter shall be permitted to operate within 50 feet of any fuel spill, POL area, explosive area, or other potentially hazardous area when identified or placarded.

2.4.4. TEMPORARY FENCING
The Contractor shall install and maintain temporary fencing around the construction activities. The temporary fencing shall be of sufficient strength and height to keep personnel out and away from all construction activities. It shall remain in place and be maintained for the duration of the construction activities.

2.4.5. PHASING OF EXCAVATION FOR UTILITIES
Excavation shall not begin until materials and equipment for that specific portion of the job are on site. Backfilling of the excavation shall be accomplished immediately after installation of the utility and have proper testing for compliance.

2.4.6. SITE RESTORATION
Rough grading of utility cuts shall be accomplished immediately after backfilling excavated trenches. Final grading, including the placing of topsoil, if required, shall be accomplished as soon as possible. Required landscaping, sodding, or seeding shall be accomplished at the earliest possible time after backfilling as stipulated in the Technical Provisions of the contract. Grass sod or hydromulched areas will be watered by the contractor until three mowing cycles are completed.

2.4.7. TRENCHING AND EXCAVATING
Excavation and related work shall be completed in scheduled phases between blocks or manholes for installations requiring testing. Work shall be barricaded in accordance with OSHA standards. For excavations in which testing is not required, the trenches shall be backfilled at the end of the day except for the last 15 feet. Backfilling must be accomplished daily; established structures and plantings must be avoided; excavation shall not begin until material and equipment for the specified portion of the job is available on the site. Trenches or excavations which cut roads, parking lots, driveways and delivery routes shall be fully coordinated between the Contractor, Fire Department, and Security Forces. The Contractor shall provide non-skid surface steel road plates until the vehicle routes are permanently repaired. Excavations and the repair which will traverse completely across vehicle routes shall be scheduled in stages which will allow crossing of vehicles until road plates and/or permanent repairs are in place.

2.4.8. INTERRUPTION OF UTILITIES
The Contractor shall not interrupt existing utilities without obtaining written permission from the Contracting Officer a minimum of 10 work days in advance.

2.4.9. SANITARY PROVISIONS
Contractor shall provide such accommodations for the use of his employees as may be necessary and shall maintain accommodations that comply with the requirements and regulations of local authorities having jurisdiction.

2.4.10. AVAILABILITY AND USE OF UTILITY SERVICES
Reasonable amounts of natural gas, water, and electricity will be furnished to the Contractor by the Government.

2.4.11. TEMPORARY ELECTRIC WIRING:

A. Temporary Power and Lighting
The Contractor shall provide construction power facilities in accordance with the safety requirements of NFPA No. 70.

B. Construction Equipment:
Temporary wiring shall be secured above the ground or floor in a workmanlike manner and shall not present an obstacle to persons or equipment. Open wiring may only be used outside of buildings, and then only in accordance with the provisions of the NEC.

C. Circuit Protection
All 15 and 20-A outlets which are not a part of the permanent wiring of the building or structure, shall have GFCI protection.

2.4.12. AS-BUILT FIELD DATA
The Contractor shall keep at the construction site two complete sets of full size, blue line/black line prints of the contract drawings. During construction, the prints shall be marked in red to show all deviations in actual construction from the contract drawings, and to note the type of material used whenever a material option is specified. They shall be made available for inspection by the Contracting Officer whenever requested during construction, and shall be submitted for approval at the completion of construction in accordance with paragraph 2.2.5 Submittal of As-Built Drawings and Specifications.

2.4.13. DIGGING PERMITS
Prior to commencing construction work or whenever the ground surface is to be disturbed deeper then three inches or when erecting structures or operating equipment near overhead lines, the Contractor shall be responsible for obtaining and having in their possession at all times, an approved digging permit. This permit will be completed no less than 10 days prior to the actual start of excavation or the erection operation.

2.4.14. PROJECT SIGN
Contractor shall furnish and install a project sign.

2.4.15. HARD HAT SIGNS
Requirements for hard hat signs will be according to OSHA Standards.

2.4.16. BULLETIN BOARD
A weatherproof bulletin board shall be provided adjacent to or mounted on the Contractor's project office.

2.4.17. CONTRACTOR' FACILITIES
The office facilities for Contractor's operations will be provided by the contractor at the location designated by the Contracting Officer.

2.4.17.1 FACILITIES FOR THE GOVERNMENT INSPECTOR
Contractor shall provide office space for the Government inspector in a separate building. The facility shall be completely separated from the Contractor's facilities and have unique locksets with all keys turned over to the Contracting Officer. Minimum requirements are as follows:

A. Area: 400 sq ft minimum.
B. Window: Overlooking site.
C. Lighting: 50 foot candles at desk level.
D. Automatic heating and cooling to maintain 68 degrees F for heating and 76 degrees F for cooling.
E. Minimum of six 110 volt duplex electrical convenience receptacles, at least one on each wall.
F. Private sanitary facilities: Provide one water closet and one lavatory, in a separate room with privacy lock on door.

2.5. ENVIRONMENTAL PROTECTION

2.5.1. DEFINITION OF CONTAMINANTS

A. Sediment: Earth that has been eroded and transported by runoff water.

B. Solid Waste: Discarded solid materials resulting from non construction activities. A variety of combustible and non-combustible wastes such as paper, boxes, glass, crockery, metal and lumber scraps, tin cans, and bones. This material shall be recycled under the base recycling program to the greatest extent possible.

C. Debris: Combustible and non-combustible wastes such as ashes and waste materials resulting from demolition and construction work.

D. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemical and inorganic wastes.

E. Sanitary Wastes:

1. Sewage: Waste which is considered as domestic sanitary sewage.
2. Garbage: Refuse and scraps resulting from preparation of food.

F. Rubble: Fill materials generated from non-reinforced concrete masonry, asphalt construction, and natural earth resulting from excavations.

G. Landclearing Waste: Trees, limbs, brush, stumps, and other vegetation generated from the clearing and grubbing of natural areas. This material shall be hauled and disposed of off the base.

2.5.2. EROSION AND SEDIMENT CONTROL MEASURES:

A. Burn-Off: Burn-off of ground cover shall not be permitted.

B. Reduction Of Exposure Of Unprotected Erodible Soils: Earthwork brought to final grade shall immediately be finished as indicated and specified. Side slopes and back slopes shall be protected immediately upon completion of rough grading. Earthwork shall be planned and conducted in such a manner as to minimize the duration of exposure of unprotected soils.

C. Temporary Protection Of Erodible Soils: Methods as required shall be utilized to effectively prevent erosion and control sedimentation including (A storm water pollution prevention plan shall be completed by a competent professional):

1. Mechanical Control Of Runoff: The rate of runoff from construction site shall be mechanically controlled. Diversion ditches shall be constructed to divert runoff to protected drainage courses.

2. Vegetation and Mulch: Temporary protection shall be provided on side and back slopes when rough grading is completed or when sufficient soil is exposed to require protection to prevent erosion. Protection shall be afforded by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting.

D. ENVIRONMENTAL PERMITTING: The Contractor shall obtain environmental permitting.

2.5.3 CONTROL AND DISPOSAL OF SOLID WASTES

Wastes shall be placed in closed metal containers which are emptied on the regular schedule. Handling and disposal shall be conducted in a manner to prevent contamination of the site and other areas. Only clean fill and excess grading material shall be allowed in base disposal area.

A. Garbage And Rubbish: Garbage and rubbish shall be disposed, by the Contractor, off-base or recycled under base program.

B. Sewage, Odor, And Pest Control: Chemical toilets or comparably effective units shall be utilized. Wastes shall be periodically collected and removed from the base. Measures shall be taken to control pests and to mask, or eliminate, undesirable odors.

C. Chemical Waste: Chemical wastes shall be stored in Department of Transportation (DOT) - approved and labeled containers and shall be disposed at least monthly, unless directed otherwise. Disposal of chemical wastes shall be in accordance with Federal, and applicable State, and Local requirements. Fueling and lubricating of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation. The COR shall be notified of oil and hazardous material spills which may be large enough to violate Federal, State, and Local regulations.

D. Rubble And Land-Clearing Waste: Rubble and land-clearing waste shall be disposed as herein before specified for "Disposal of Rubbish and Debris."

2.5.4. DUST CONTROL
Dust shall be minimized at all times; including non-work hours, weekends, and Federal legal holidays.

2.5.5. NOISE
The maximum use of "low-noise-emission products", as certified by the EPA, shall be made when available. Blasting or explosives shall not be permitted.

2.6. ACCEPTANCE OF CONSTRUCTION
Concurrent with submission of DD Form 1354 described in paragraph 3.7.2., one print of each of the drawings accompanying the specifications shall be neatly and clearly marked in red to show all variations or changes between the construction "as-built" and that indicated or specified. The drawings shall be delivered to the COR. Improper as-built drawings will be considered a punch list item, and must be completed and acceptable before final tests or inspection will be considered complete. After acceptance of the as-built prints, the Contractor shall submit corrected original contract documents including updated CAD disks in format previously specified to the Contracting Officer for acceptance. Final payment will not be made until acceptance of original as-built drawings documents are accepted by the Contracting Officer.

3.0 CONSTRUCTION QUALITY CONTROL

3.1. SUBMITTAL
A list of tests which the Contractor is required to perform shall be furnished to the Contracting Officer. The list shall give the test name, the test requirements, and the personnel and laboratory, to include qualifications of each, responsible for each type of test.

3.2. QUALITY CONTROL ORGANIZATION

3.2.1. GENERAL
The quality control system manager and surveillance personnel shall be fully qualified by experience and background to perform their assigned responsibilities.

3.2.2. SYSTEM MANAGER
The Contractor shall identify an individual, within his organization at the site of the work, who shall be responsible for overall management and have the authority to act in all quality control matters for the Contractor, and shall be directly responsible to the principal-in-charge of the construction firm.

3.2.3. PERSONNEL
A staff shall be maintained under the direction of the Contractor’s Project Manager to perform all QC activities. The actual strength of the staff during any specific work period may vary to cover work phase needs, shifts, and rates of placement. The personnel of this staff shall be fully qualified by experience, appointment, and technical training to perform their assigned responsibilities.

3.3. QUALITY CONTROL MEETINGS
The Contractor’s Project Manager shall meet with the Contracting Officer at regular intervals, weekly or as considered necessary by the Contracting Officer, to assess the effectiveness of the quality control system. Special meetings may be called at any time when desired by the Contracting Officer. Reports will be reviewed to determine their effectiveness in the overall quality control system.

3.4. CONTROL OF ON-SITE AND OFF-SITE CONSTRUCTION
The Contractor’s quality control system shall include at least the following three phases of control and management for definable features of work:

3.4.1. PREPARATORY PHASE
This control phase shall be performed before beginning work on each definable feature of work. Action shall be taken to ensure that only materials and equipment which comply with Contract requirements are purchased and/or used in offsite fabrication, unless specific deviations are approved as specified above. The Contracting Officer shall be notified at least 24 hours in advance of each preparatory activity.

3.4.2. INITIAL PHASE

This phase of control must be accomplished at the time of arrival of workmen onsite to accomplish a definable feature of work and at any time new workmen or crews arrive for assignment to the work. The Contractor's quality control system shall be organized in such a manner to permit the transfer of information on quality requirements specified in this Contract to each workman before he starts. The Contracting Officer shall be notified at least 24 hours in advance of each initial activity. Acceptance of this work constitutes the establishment of the quality benchmark of acceptable practice for the definable feature of work.

3.4.3. FOLLOW-UP PHASE

The follow-up phase shall be performed continually to verify that control procedures are providing an end product which complies with Contract requirements. Adjustments to control procedures may be required based upon the results of this phase and control testing.

3.5. TESTING

3.5.1. GENERAL

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. The location and frequency of tests required depends on the manner in which the work is being performed and the uniformity and quality of the tests obtained. Additional testing required by the Contracting Officer will be at no additional cost to the Government when the minimum testing program is not considered to be adequate or applicable or when visual evidence indicates the materials are unsuitable or other types of materials are involved. The Contractor shall perform the following activities and provide the corresponding data:

- Verify that test procedures comply with Contract requirements.
- Verify that facilities and testing equipment are available and comply with testing standards.
- Check test instrument calibration data against certified standards.
- Verify that recording forms, including all of the test documentation requirements, have been prepared.

3.5.2. NONCOMPLIANCE

Tests indicating noncompliance with the Contract shall be reported immediately to the Contracting Officer with recommendations to correct the deficiencies. The Contracting Officer will approve steps to be taken to alleviate noncompliance conditions if the specifications do not. The Contracting Officer may designate the location of additional sampling and the type of test to be performed. Retesting will be performed by the Contractor at his expense.

3.5.3. LABORATORY FACILITIES AND PROCEDURES

The Contractor shall procure the services of an approved laboratory at the project site.

A. The Contracting Officer reserves the right to utilize the Contractor's control testing laboratory and/or equipment to make assurance tests and to check the Contractor's testing procedures, technique, and test results at no additional cost to the Government.

B. NOTIFICATION OF NONCOMPLIANCE: The Contracting Officer will notify the Contractor of any noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

C. LOG BOOK AND SAMPLE NUMBERS: A testing log book shall be maintained at the laboratory and be divided into five parts for recording sample numbers of tests on (S) soils and base course material, (A) asphalt and asphaltic concrete, (C) concrete, (G) aggregates, and (O) other types of material such as masonry, roofing material, etc. Retests of failed test samples shall be assigned the same number as the original tests with a final letter to identify them as a retest.

3.5.4. SUBMITTAL OF TEST REPORTS

Copies of each test result shall be prepared with all necessary data recorded and with documentation and computations compiled. Distribution of two copies to the COR shall be made within the following workday after each test is completed.

3.6. QUALITY CONTROL REPORT

3.6.1. GENERAL

The Contractor shall maintain daily records and shall submit reports to the COR of quality control activities daily. The reports shall be factual records containing numerical data of the Contractor's daily quality control activities and resulting actions. The reports shall be submitted on approved forms in duplicate noon of the next workday following the day of the report.

A. The report shall contain a record of inspections for all work accomplished subsequent to the previous work. Separate reports for different phases of work may be submitted by the responsible quality control inspectors or the reports may be consolidated into one report if all quality control activities and results are covered and the responsible quality control inspectors are identified.

B. Reports shall be verified and signed by the persons (or designated alternates) delegated this responsibility by the Contractor. The verification shall contain the statement that all supplies and materials incorporated in the work are in compliance with the terms of the Contract.

3.6.2. SPECIFIC REQUIREMENTS

The reports shall include the following:

- Phases of construction underway during the time of the report, including a listing of equipment and number of people involved in the activity by craft and the duration of the activity.
- Type, number, and locations of inspections that were made.
- Results of inspections, including nature of deficiencies observed and corrective actions taken or to be taken.
- Report of tests performed with the results of the tests, including failures; the specification requirement; and any tolerance where applicable and remedial action taken or to be taken. Test results, including all computations, shall be attached to the report form.
- Other information as applicable to the project, including:

    1. Weather conditions;
    2. Subcontractor operations;
    3. Monitoring of materials and equipment upon arrival at the jobsite for compliance with approved shop drawings, damage during transit, and proper storage;
    4. Off-site surveillance activities; and
    5. Job safety.

3.7. PROJECT CLOSEOUT

3.7.1. OPERATION AND MAINTENANCE MANUAL

As previously stated

3.7.2 PREPARATION OF DD FORM 1354 "TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY"

At the conclusion of the project the Contractor will be responsible to compile and furnish to the Contracting Officer, DD Form 1354 for each building with accompanying floor plan indicating all costs and quantity data of materials and systems furnished and installed. A list of items for which the costs and quantity data is required will be furnished to the Contractor.